IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Shafer , et al.	
Application No.: 10/789,781	Group Art Unit: 1711
Filed: 2/27/2004	Examiner: T. Boykin
Title: Liquid crystal polycarbonates and methods of preparing same	Confirmation No: 9454
Attorney Docket No.: GEPL.P-093	
Customer No.: 043247	

DECLARATION UNDER RULE 132

The undersigned hereby each declare as follows:

1. I am an inventor of the above-captioned application. I am familiar with the application including the claims.

2. I am aware that an official action issued in this case on September 7, 2005 in which the Examiner asserted that using an activated carbonate as described in US Pub 2003/0208027 the preparation of liquid crystal polycarbonates of the type disclosed in US Patent Nos. 4,831,105 or 5,102,975. As a person skilled in the art, I do not believe that this would have been obvious.

3. The process carried out in US Pub 2003/0208027 is a melt process. It is known in the art that the melting point of liquid crystalline materials such as those in the primary references is very high, and that oligomers of the liquid crystalline material tend to crystallize as soon as formed. This means that it very difficult to force the reaction to polymers in a conventional DPC-based melt reaction, other than at very high temperatures. At these temperatures, however, the

monomers are volatile, and thus, it is difficult to control the stoichiometry of the product.

4. One of the benefits of using activated diaryl carbonates in the making of polycarbonates such as BPA-polycarbonate as described in US Pub 2003/0208027 is the ability to use milder reaction conditions, for example lower reaction temperatures, and still get a good reaction rate. A person skilled in the art would not expect this to be of benefit in the making of the liquid crystal polycarbonates since operating at a lower temperature would not provide a melt of a preformed oligomer/polymer, and would not apparently overcome the crystallization out of oligomers as soon as they are formed.

5. Applicants believe that the ability to make liquid crystalline polycarbonates from the recited monomers with activated diaryl carbonate reactants arises from different characteristics of the reaction than those that make the use of activated diaryl carbonates beneficial in the case of more conventional amorphous polycarbonates. In an amorphous material such as the polycarbonates of the secondary reference, the material softens gradually and reaction can occur in softened portions and the greater reactivity of the activated diaryl carbonate enhances this reaction, allowing the overall reaction to occur at lower temperature. On the other hand, in a crystalline material, such as that which forms when making polymers in accordance with the invention, the transition to melted happens sharply, meaning that higher temperatures are required to drive the reaction, not merely greater reactivity.

6. Theory would suggest that using a higher activity diaryl carbonate would not allow reduction in reaction temperature relative to the temperature required to melt the crystalline oligomers formed. In fact much lower temperatures can be employed at which the loss of volatile monomers and rearrangement processes are much less significant. Furthermore, it is surprisingly found that the essentially no free monomer remains in the crystallized oligomers at the end of the reaction. This allows the resulting oligomer to be taken above its melting point to proceed with polymerization without loss of monomer, thus retaining the original stoichiometry. In contrast, while monomers may crystallize to some extent in a DPC-reaction, the will contain

unreacted monomer such that upon melting monomer will be lost changing the stoichiometry.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

dated: March 3, 2006

Sheldon Shafer

dated: March 3, 2006

Julia Lee